FILE C

Mathematics

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Item Information and Scoring Guide Reference Sheet

The following pages are designed to assist you in understanding how Maine Educational Assessment (MEA) items are scored. These pages contain the text for each released item accompanied by the following information.

Multiple-Choice Items

The boxes containing the multiple-choice items also contain the percent of students statewide who chose each answer option. The correct option is asterisked(*).

- **MC#:** the multiple-choice item position in the Class Analysis Report
  One point may be earned for a multiple-choice item.
- **Key:** the letter of the correct answer for the multiple-choice item
- **Calculator:** indication of whether a calculator was an allowed tool in the session during which the item was administered
- **Cluster:** the cluster the item measured
- **Content Standard:** the content standard that the item measured
- **Grade Level Expectation (GLE):** the grade level expectation that the item measured

Short-Answer Items

- **SA#:** the short-answer item position in the Class Analysis Report
  Up to two points may be earned for a short-answer item.
- **Calculator:** indication of whether a calculator was an allowed tool in the session during which the item was administered
- **Cluster:** the cluster the item measured
- **Content Standard:** the content standard that the item measured
- **Grade Level Expectation (GLE):** the grade level expectation that the item measured
- **Short-Answer Scoring Guide:** the description of each score point used to determine the score, including the percent of students statewide who received each score and the statewide average student score
- **Training Notes:** in-depth descriptions or particular information used to determine the score
- **Annotated Student Response:** sample student response for each score point with annotations that explain the reasoning behind the assigned score

Item Information and Scoring Guide Reference Sheet

Constructed-Response Items

- **CR#:** the constructed-response item position in the Class Analysis Report
  Up to four points may be earned for a constructed-response item.
- **Calculator:** indication of whether a calculator was an allowed tool in the session during which the item was administered
- **Cluster:** the cluster the item measured
- **Content Standard:** the content standard that the item measured
- **Grade Level Expectation (GLE):** the grade level expectation that the item measured
- **Constructed-Response Scoring Guide:** the description of each score point used to determine the score, including the percent of students statewide who received each score and the statewide average student score
- **Training Notes:** in-depth descriptions or particular information used to determine the score
- **Annotated Student Response:** sample student response for each score point with annotations that explain the reasoning behind the assigned score

MEA 2005–2006

Mathematics Grade 5

The table below shows the entire MEA mathematics test design. Half of the common items are released and can be found in this document. Item information for all item types, scoring information (average scores, guides, and training notes) for all short-answer and constructed-response items, and annotated student responses follow.

2005–2006 MEA MATHEMATICS TEST DESIGN

Content Area	Common			Embedded Field Test			Total Items per Student			Base Testing Time	Points
	MC	CR	SA	MC	CR	SA	MC	CR	SA		
Mathematics	32	2	4	8	2	1	40	4	5	130 min.	48

Each item on the MEA measures a grade level expectation based on Maine's *Learning Results*. Score points for items are accumulated and reported in clusters. Each content standard is included in a cluster as indicated below.

Mathematics Clusters

1. **Numbers and Operations**
   - Numbers and Number Sense
   - Computation
   - Discrete Mathematics
2. **Shape and Size**
   - Geometry
   - Measurement
3. **Mathematical Decision Making**
   - Data Analysis and Statistics
   - Probability
   - Mathematical Reasoning
4. **Patterns**
   - Patterns, Relations, and Functions
   - Algebra Concepts
   - Mathematical Communication

1. Mr. Bennett's students earned $50 to buy toys for the school toy drive. They bought

   - 5 teddy bears for $4.50 each, and
   - 8 toy trucks for $3.25 each.

   How much money did they have left?

*55%	A. $ 1.50
11%	B. $ 8.50
13%	C. $11.50
20%	D. $48.50

MC#: 1
Key: A
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard B: Computation- Students will understand and demonstrate computation skills (no calculator use for straight computation; numbers used in this section should match those listed for standard A).
GLE: B2.5- Students will be able to create, solve, and justify the solution for multi-step, real-life problems involving all four operations on whole numbers (1-digit divisor, 3-digit dividend) and addition and subtraction with simple fractions with common denominators and decimals to hundredths.

2. There were 4328 people at the Lincoln County Fair and 2194 people at the Johnson County Fair. Which estimate is closest to the total number of people who attended the two fairs?

14%	A. 6000
*74%	B. 6500
7%	C. 7000
5%	D. 7500

MC#: 2
Key: B
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard B: Computation- Students will understand and demonstrate computation skills (no calculator use for straight computation; numbers used in this section should match those listed for standard A).
GLE: B1.5- Students will be able to compute and model all four operations on whole numbers (1-digit divisor, 3-digit dividend) and addition and subtraction with simple fractions with common denominators and decimals to hundredths and do straight computation with these numbers and operations.

3. Gene has $\frac{3}{5}$ of a pound of grapes. Mark has more grapes than Gene has. On the number line below, the space between 0 and 1 has been divided into 10 equal parts.

Which point on the number line could show the number of pounds of grapes that MARK has?

6%	A. point A
22%	B. point B
26%	C. point C
*46%	D. point D

MC#: 3
Key: D
Calculator: Not Allowed
Cluster: Shape and Size
Content Standard E: Geometry- Students will understand and apply concepts from geometry.
GLE: E2.5- Students will be able to plot non-negative values as points on a number line.

4. Emily is planning a camping trip for herself and 5 friends. She makes a trail mix with 2 cups of raisins for each person and 3 cups of granola for each person. Which number sentence shows the total number of cups of trail mix Emily makes for the trip?

27%	A.	$6 \times 3 + 2 = \square$
24%	B.	$6 + 3 + 2 = \square$
*39%	C.	$6 \times 2 + 6 \times 3 = \square$
10%	D.	$6 + 2 \times 6 + 3 = \square$

MC#: 4
Key: C
Calculator: Not Allowed
Cluster: Patterns
Content Standard G: Patterns, Relations, and Functions- Students will understand that mathematics is the science of patterns, relationships, and functions.
GLE: G1.5- Students will be able to translate real-life situations into addition, subtraction, multiplication, or division sentences.

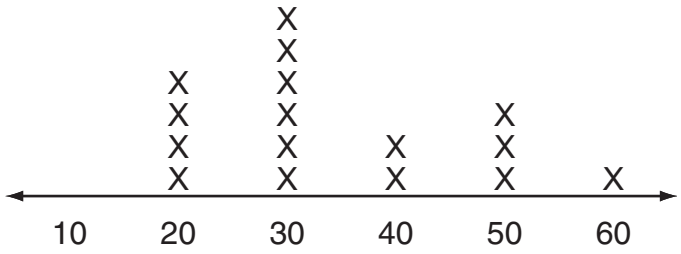
5. A computer program can be used to calculate students' average grades. It rounds each average grade to the nearest tenth. Otto's average grade is 83.627. To what number does the computer round Otto's grade?

*34%	A. 83.6
26%	B. 83.63
9%	C. 83.7
29%	D. 84

MC#: 5
Key: A
Calculator: Not Allowed
Cluster: Numbers and Operations
Content Standard A: Numbers and Number Sense- Students will understand and demonstrate a sense of what numbers mean and how they are used.
GLE: A1.5- Students will be able to compare, order, use, and represent simple fractions (halves, fourths, fifths, and tenths with all numerators) and decimals to hundredths.

6. The line plot below shows, to the nearest 10 minutes, the average number of minutes some students spent on homework each day.

Average Number of Minutes Spent Doing Homework Each Day



Minutes

a. What is the range for these data? Show or explain how you found your answer.

b. What is the mode for these data? Show or explain how you found your answer.

c. A new student arrives. She does homework for 10 minutes each day. Explain how this new piece of data will affect each of these statistics:

- the range
- the mode

CR#: 6
Calculator: Not Allowed
Cluster: Mathematical Decision Making
Content Standard C: Data Analysis and Statistics- Students will understand and apply concepts of data analysis.
GLE: C1.5- Students will be able to organize data to find mode, median and range of a set of values.

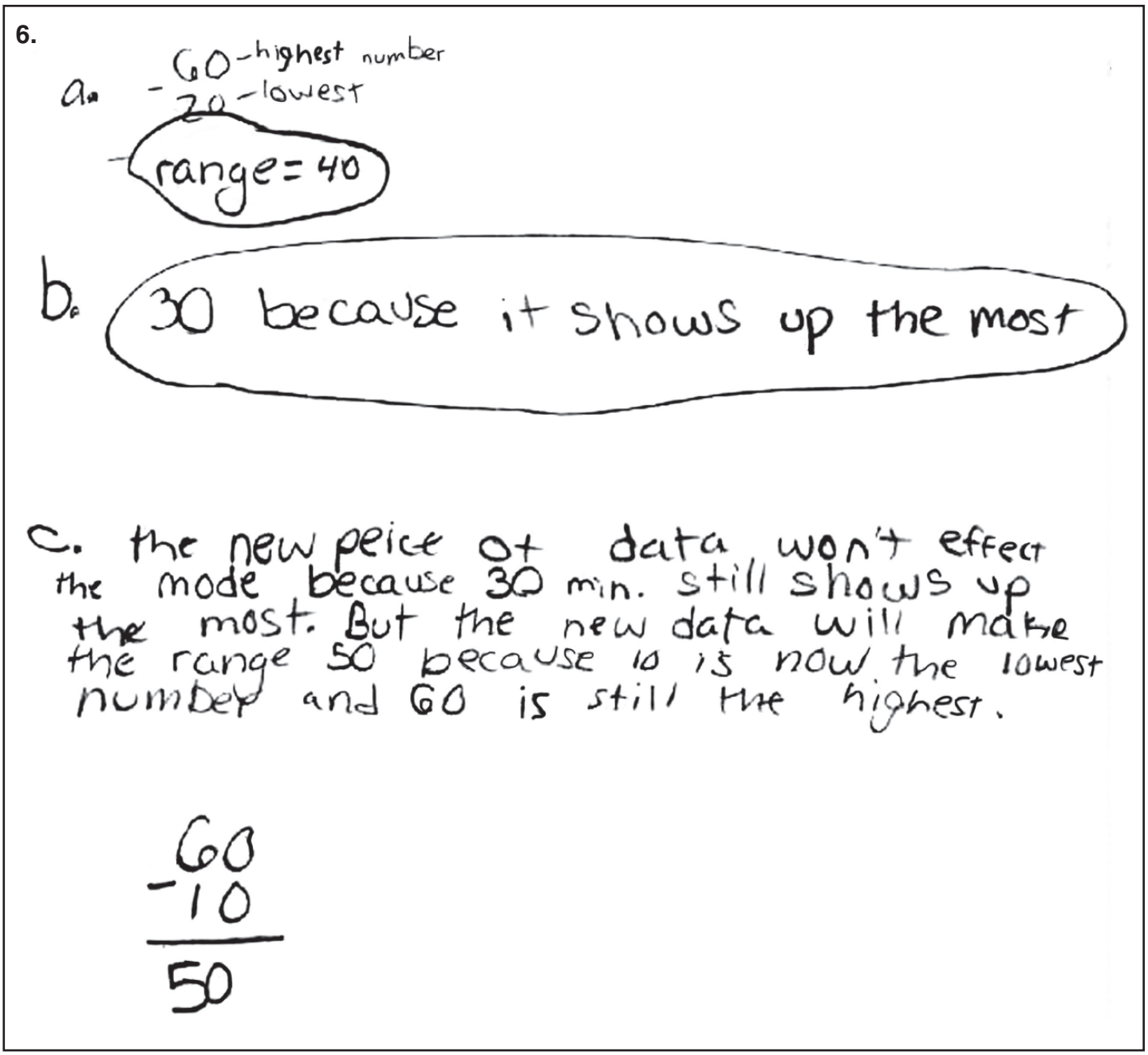
Percentage of Statewide Student Scores	Score	Description
9%	4	4 points
13%	3	3 or 3½ points
12%	2	2 to 2½ points
24%	1	½ to 1½ points OR minimal understanding of central tendency statistics
37%	0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
6%	Blank	No response.
1.22	Statewide average student score.	

Training Notes for Constructed-Response Item 6

Part a:	1 point	for correct range [40] with explanation or work shown indicating correct strategy [60-20] OR
	½ point	for correct answer OR correct strategy
Part b:	1 point	for correct mode [30] with explanation or work shown indicating correct strategy [mode is the most frequent data point, which is 30 minutes] OR
	½ point	for correct answer OR correct strategy
Part c:	2 points	for complete and correct explanation of the effect of the new data point on range and mode (see solution notes) OR
	1 point	for correctly explaining the effect of the new data point on range or mode

Sample Response (part c)
The **range** will increase because 10 minutes is lower than the previous minimum.
The **mode** will not be affected because 30 is still the most frequent data value.

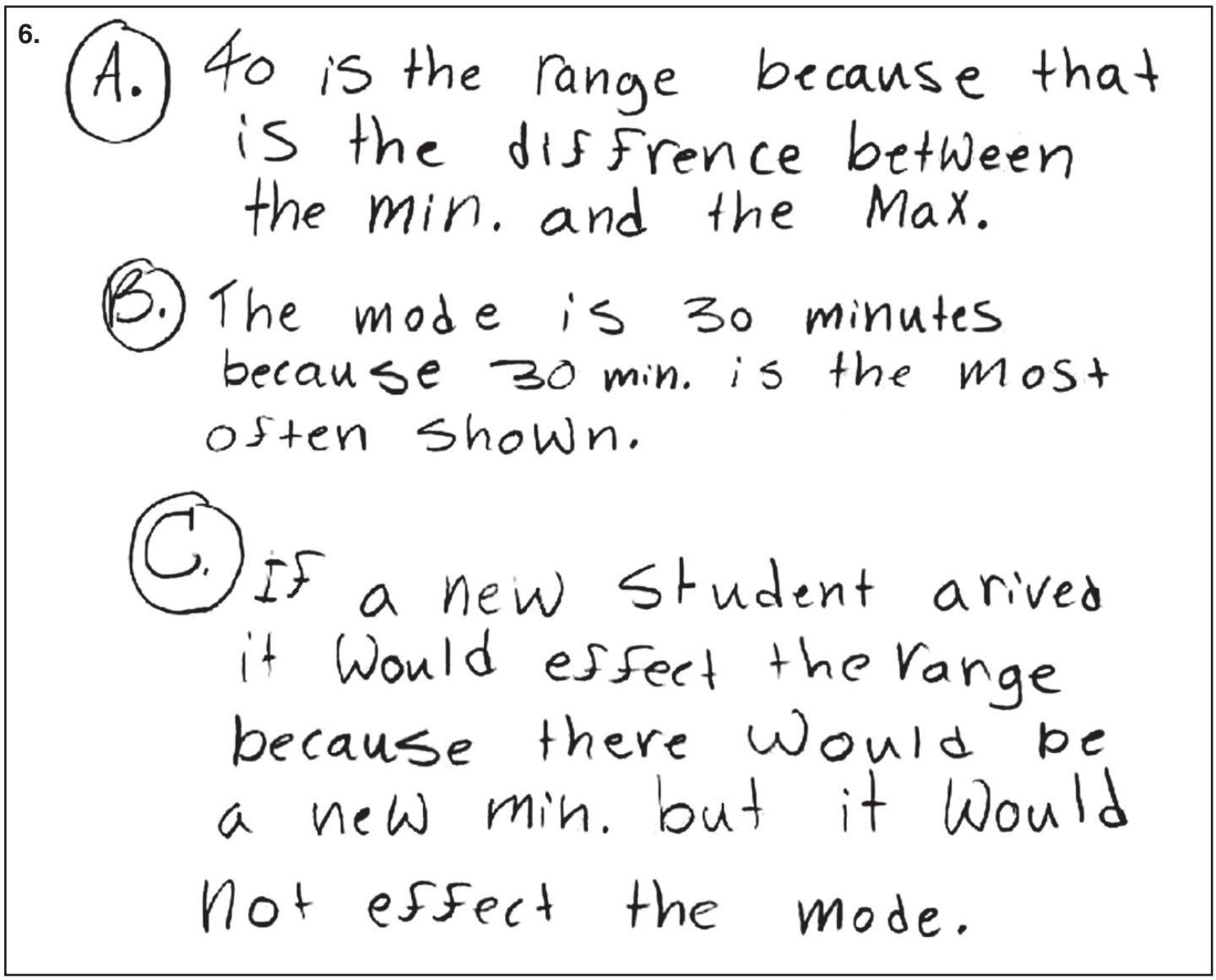
NOTE: If student confuses names of statistical measures but uses correct strategies, deduct 1 point from total. (minimum score = 1)



Summary annotation statement:

The student earns 1 point in part a for finding the correct range using a correct strategy. The student earns another point in part b for finding the correct mode and providing an explanation for the answer. In part c the student earns 2 points for providing a complete and correct explanation of the effect of the new data point on both the line plot's range and the mode. Using the scoring guide, 4 total points is a score point 4.

Sample 3-Point Response with Annotations for Constructed-Response Item 6

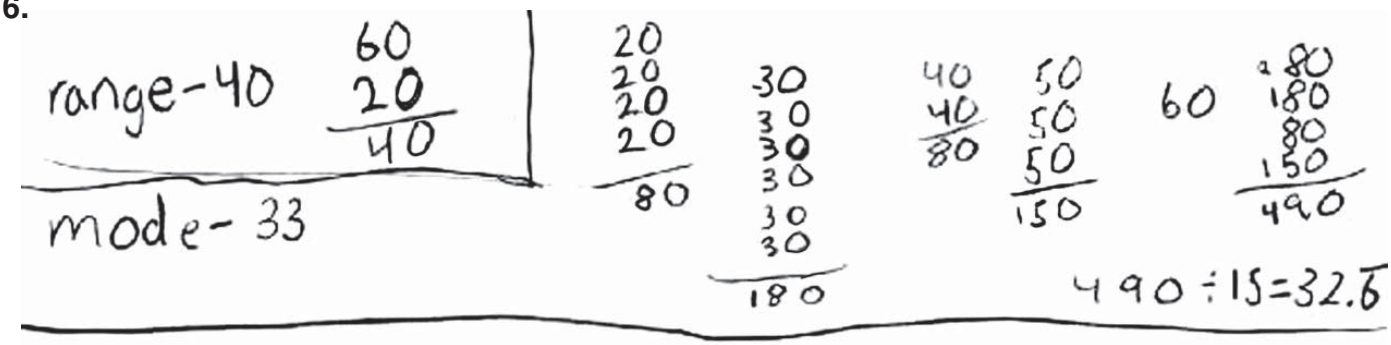


Summary annotation statement:

This response correctly finds and explains the range in part a for 1 point, correctly finds and explains the mode in part b for another point, and correctly explains the effect of the new data point on the range in part c for a third point. However, the student's explanation of why the new point does not affect the mode is incomplete. According to the scoring guide, 3 total points is a score point 3.

Sample 2-Point Response with Annotations for Constructed-Response Item 6

6.



the range becose you will have to do 60-10=50 instead of 60-20=4

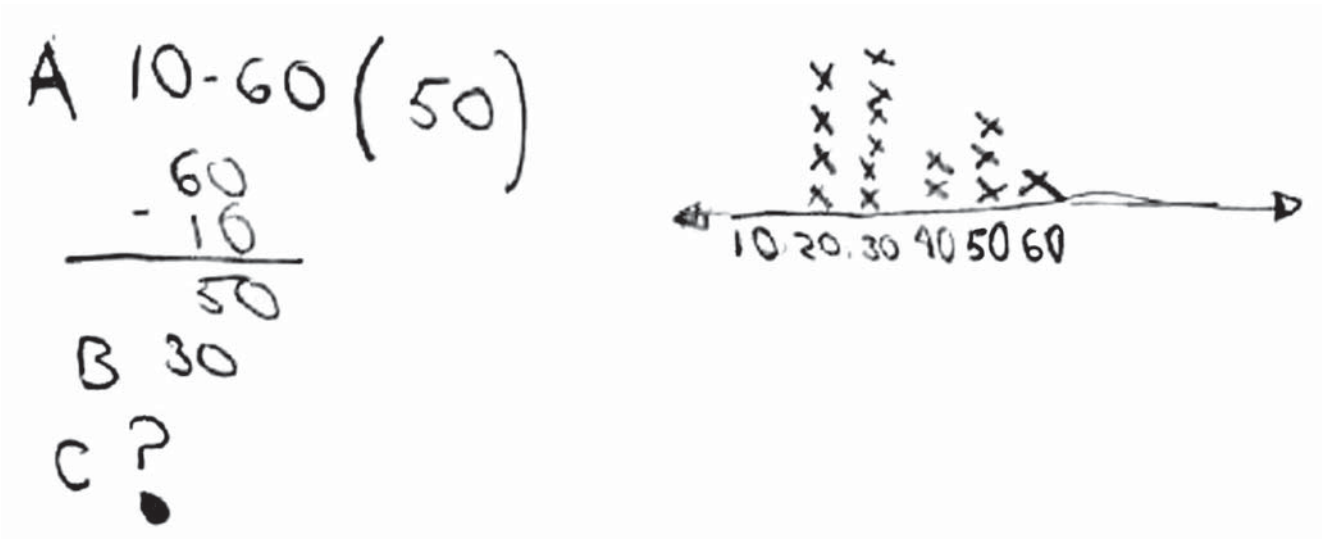
the mode becose you will have to add 10 to 490 then÷it by 16

Summary annotation statement:

The student earns 1 point in part a because it contains a correct range with the strategy shown. The student earns no points for part b because he or she used an incorrect strategy to find an incorrect answer. A second point is earned in part c for correctly showing the effect of the new data point on the range. Again, the student's work for the mode is incorrect. A total of 2 points earns a score point of 2.

Sample 1-Point Response with Annotations for Constructed-Response Item 6

6.

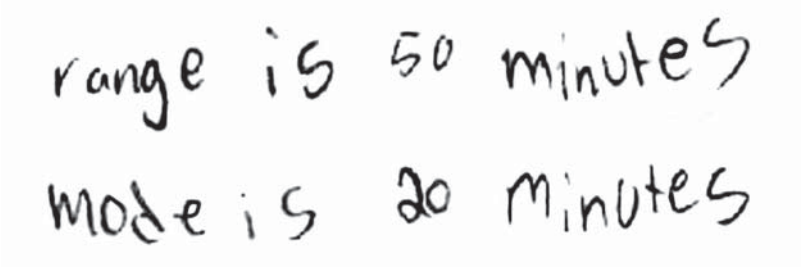


Summary annotation statement:

This response earns only half a point for providing a correct answer to part b; however, there is no strategy or explanation. Copying a given graph is not a strategy. Using the scoring guide, a half point earns a score point of 1.

Sample 0-Point Response with Annotations for Constructed-Response Item 6

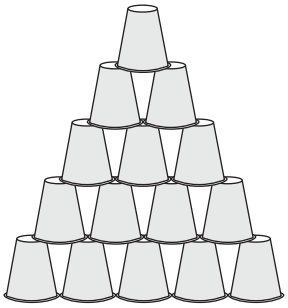
6.



Summary annotation statement:

The student attempts to answer parts a and b, but provides incorrect answers and no strategy or explanation are shown.

7. Joe is going to build a paper-cup tower. He makes the drawing and table below to help him figure out how many paper cups he will need.



Cups on bottom	Cups in all
2	3
3	6
4	10
5	15

Joe wants to have 7 cups on the bottom. How many cups will he need in all?

8%	A. 20
16%	B. 21
*68%	C. 28
6%	D. 30

MC#: 7
Key: C
Calculator: Allowed
Cluster: Patterns
Content Standard G: Patterns, Relations, and Functions- Students will understand that mathematics is the science of patterns, relationships, and functions.
GLE: G3.5- Students will be able to solve problems involving linear patterns in tables, graphs, words or rules using whole numbers.

8. A rectangular television screen is 16 inches long and 22 inches wide. Which measurement is the best estimate for the perimeter of the screen?

39%	A. 40 inches
*47%	B. 80 inches
3%	C. 200 inches
10%	D. 300 inches

MC#: 8
Key: B
Calculator: Allowed
Cluster: Shape and Size
Content Standard F: Measurement- Students will understand and demonstrate measurement skills.
GLE: F3.5- Students will be able to find area and perimeter of rectangles with whole numbers (includes formula use) with correct units.

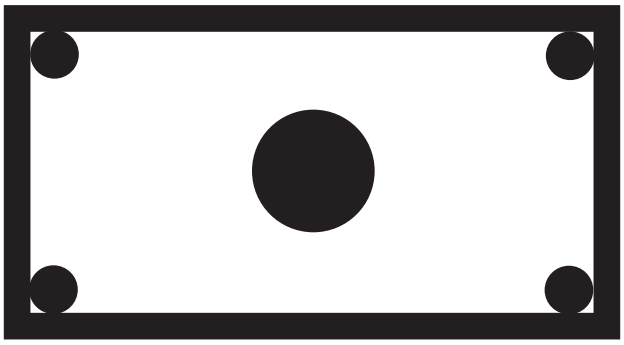
Input	Output
1	4
2	5
3	6
4	7
5	8

9. When n is the input, what is the output?

*55% A. $n + 3$
12% B. $n + 1$
16% C. $3n$
16% D. $4n$

MC#: 9
Key: A
Calculator: Allowed
Cluster: Patterns
Content Standard G: Patterns, Relations, and Functions- Students will understand that mathematics is the science of patterns, relationships, and functions.
GLE: G3.5- Students will be able to solve problems involving linear patterns in tables, graphs, words or rules using whole numbers.

10. Justin's painting is shown below.



How many lines of symmetry does Justin's painting have?

3%	A.	0
3%	B.	1
*39%	C.	2
54%	D.	4

MC#: 10
Key: C
Calculator: Allowed
Cluster: Shape and Size
Content Standard E: Geometry- Students will understand and apply concepts from geometry.
GLE: E1.5- Students will use properties/attributes limited to number of sides, number of angles, and length of sides, and lines of symmetry, to classify polygons.

11. The table below shows the results of a model car race.

Race Results

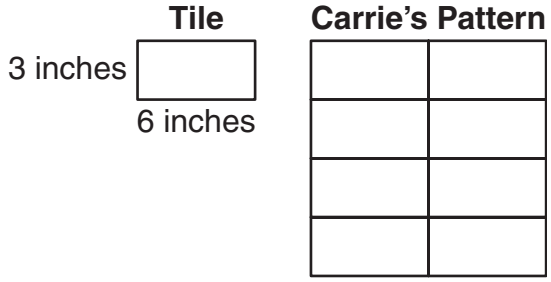
Racer	Time (seconds)
Jo Anna	14.09
Billie	14.8
Missy	14.79

Which list shows the racers in order of their finish (least time to greatest time)?

*30%	A.	JoAnna, Missy, Billie
15%	B.	JoAnna, Billie, Missy
10%	C.	Billie, Missy, JoAnna
44%	D.	Billie, JoAnna, Missy

MC#: 11
Key: A
Calculator: Allowed
Cluster: Numbers and Operations
Content Standard A: Number and Number Sense- Students will understand and demonstrate a sense of what numbers mean and how they are used.
GLE: A1.5- Students will be able to compare, order, use, and represent simple fractions (halves, fourths, fifths, and tenths with all numerators) and decimals to hundredths.

12. Carrie used the rectangular tile shown below to make a pattern.



What is the area of Carrie's pattern?

*52%	A. 144 square inches
10%	B. 108 square inches
17%	C. 81 square inches
21%	D. 36 square inches

MC#: 12
Key: A
Calculator: Allowed
Cluster: Shape and Size
Content Standard F: Measurement- Students will understand and demonstrate measurement skills.
GLE: F3.5- Students will be able to find area and perimeter of rectangles with whole numbers (includes formula use) with correct units.

13. Manuel bought 3 CDs that cost $8 each and 3 notebooks that cost $2 each. He used the expression below to calculate his total bill.

$$\mathbf{(3 \times 8) + (3 \times 2)}$$

What is another way Manuel can calculate his total bill?

33%	A.	$3 \times 8 \times 2$
*47%	B.	$3 \times (8 + 2)$
6%	C.	$3 + 8 + 2$
13%	D.	$(3 \times 8) + 2$

MC#: 13
Key: B
Calculator: Allowed
Cluster: Numbers and Operations
Content Standard B: Computation- Students will understand and demonstrate computation skills (no calculator use for straight computation; numbers used in this section should match those listed for Standard A)
GLE: B1.5- Students will be able to compute and model all four operations on whole numbers (1-digit divisor, 3-digit dividend) and addition and subtraction with simple fractions with common denominators and decimals to hundredths and do straight computation with these numbers and operations.

14. How long is this baby footprint to the nearest $\frac{1}{4}$ inch?

7%	A.	3 inches
21%	B.	$3\frac{1}{4}$ inches
*56%	C.	$3\frac{1}{2}$ inches
15%	D.	$3\frac{3}{4}$ inches

MC#: 14
Key: C
Calculator: Allowed
Cluster: Shape and Size
Content Standard F: Measurement- Students will understand and demonstrate measurement skills.
GLE: F2.5- Students will be able to use a ruler to measure length to the nearest quarter inch and centimeter.

15. What is *k*?

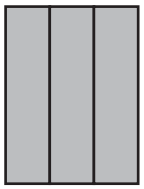
12 – *k* = 4

2%	A.	3
*93%	B.	8
4%	C.	16
1%	D.	48

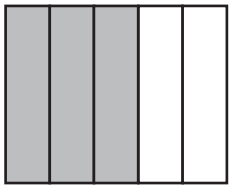
MC#: 15
Key: B
Calculator: Allowed
Cluster: Patterns
Content Standard H: Algebra Concepts- Students will understand and apply algebraic concepts.
GLE: H6.5- Students will be able to solve one-step equations using addition, subtraction, or multiplication with a variable. Values for variables are limited to whole numbers.

16. Josh has painted 0.3 of a fence gray. Which picture shows 0.3 painted?

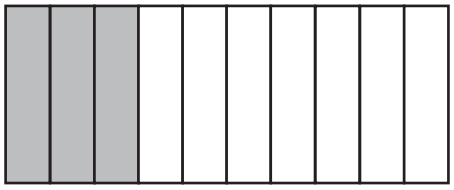
40% A.



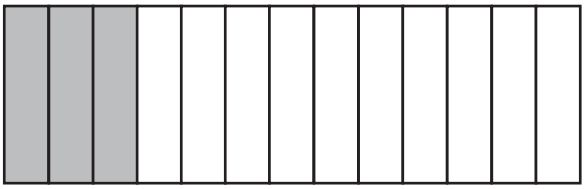
7% B.



*43% C.



10% D.



MC#: 16
Key: C
Calculator: Allowed
Cluster: Numbers and Operations
Content Standard A: Numbers and Number Sense- Students will understand and demonstrate a sense of what numbers mean and how they are used.
GLE: A1.5- Students will be able to compare, order, use, and represent simple fractions (halves, fourths, fifths, and tenths with all numerators) and decimals to hundredths.

17. Lilly has 3 cartons of milk and 1 carton of juice in her refrigerator. If Lilly takes out one carton without looking, what is the probability that it is a carton of milk?

11%	A.	$\frac{1}{4}$
18%	B.	$\frac{1}{3}$
*63%	C.	$\frac{3}{4}$
6%	D.	$\frac{4}{3}$

MC#: 17
Key: C
Calculator: Allowed
Cluster: Mathematical Decision Making
Content Standard D: Probability- Students will understand and apply concepts of probability.
GLE: D1.5- Students will be able to find the probabilities of simple events and represent them as fractions (1/2, 1/3, 2/3, 1/4, 2/4, 3/4 eligible).

18. Compute:

a. $\frac{3}{10} + \frac{4}{10}$

b. $\frac{4}{5} - \frac{1}{5}$

SA#: 18
Calculator: Allowed
Cluster: Numbers and Operations
Content Standard B: Computation- Students will understand and demonstrate computation skills (no calculator use for straight computation; numbers used in this section should match those listed for Standard A).
GLE: B1.5- Students will be able to compute and model all four operations on whole numbers (1-digit divisor, 3-digit dividend) and addition and subtraction with simple fractions with common denominators and decimals to hundredths and do straight computation with these numbers and operations.

Percentage of Statewide Student Scores	Score	Description
70%	2	2 points
12%	1	1 point
16%	0	Response is incorrect and there is no relevant correct work.
1%	Blank	No response.
1.53	Statewide average student score.	

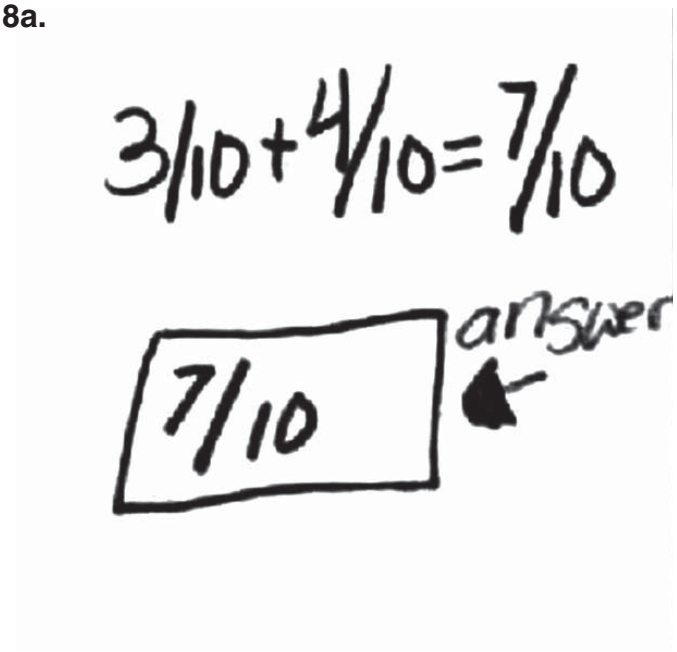
Training Notes for Short-Answer Item 18

Part a: 1 point for correct answer, $\frac{7}{10}$ (or equivalent).

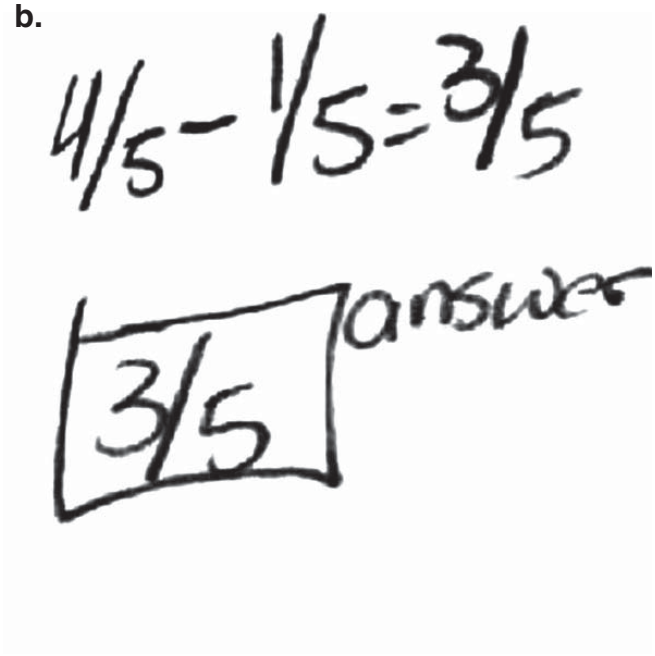
Part b: 1 point for correct answer, $\frac{3}{5}$ (or equivalent).

Sample 2-Point Response with Annotations for Short-Answer Item 18

18a.



b.

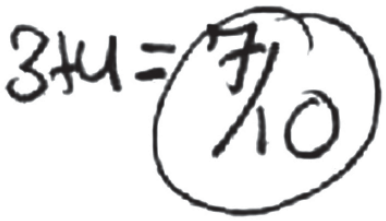


Summary annotation statement:

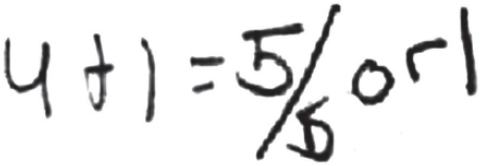
The student earns 1 point in both part a and another point in part b for the correct answer in each part. According to the scoring guide, 2 total points is a score point 2.

Sample 1-Point Response with Annotations for Short-Answer Item 18

18a.



b.

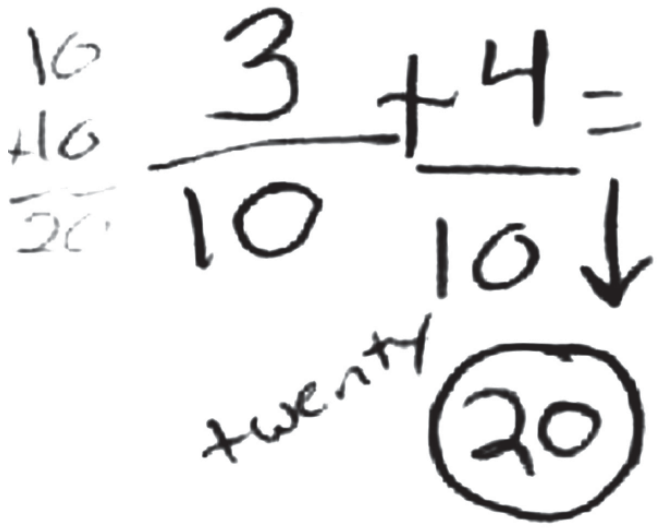


Summary annotation statement:

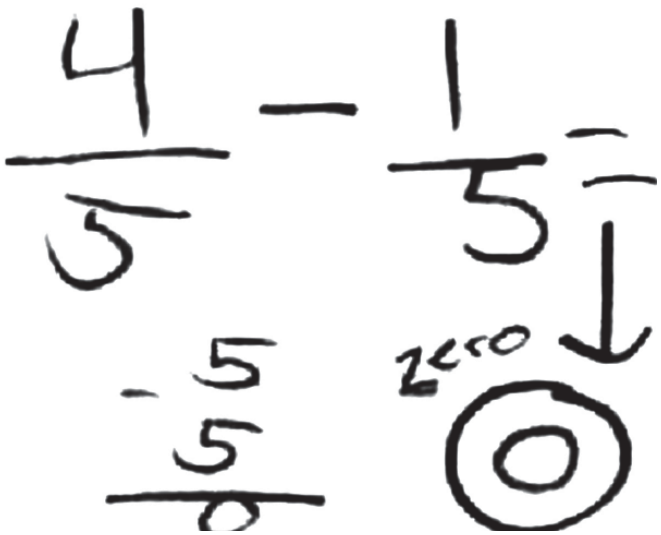
This response has a correct answer in part a, earning 1 point. Work does not need to be shown so no deduction for incomplete recording. The answer in part b is incorrect. One total point is a score point 1.

Sample 0-Point Response with Annotations for Short-Answer Item 18

18a.



b.



Summary annotation statement:

Neither part a nor part b contain the correct answer, so the student receives a score point 0 for this question.

19. Solve each equation.

a. $8 \times n = 24$

b. $p \times 6 = 72$

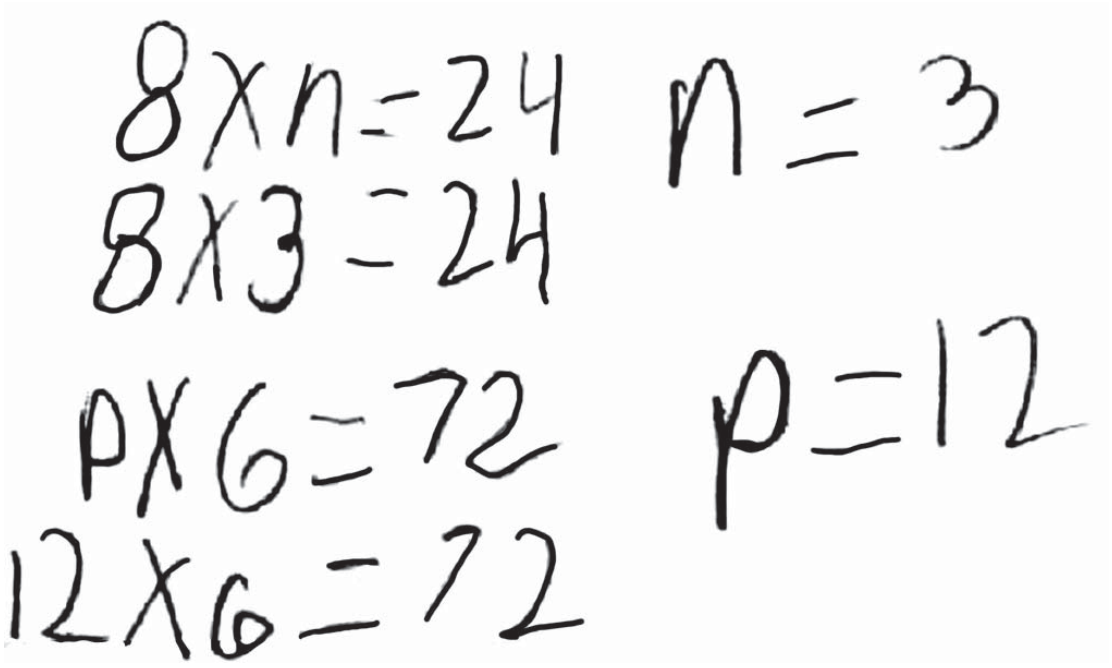
SA#: 19
Calculator: Allowed
Cluster: Patterns
Content Standard H: Algebra Concepts- Students will understand and apply algebraic concepts.
GLE: H6.5- Students will be able to solve one-step equations using addition, subtraction, or multiplication with a variable. Values for variables are limited to whole numbers.

SHORT-ANSWER SCORING GUIDE

Percentage of Statewide Student Scores	Score	Description
84%	2	Correct answer (a. 3, b. 12).
10%	1	One part is correct.
4%	0	Response is incorrect and there is no relevant correct work.
1%	Blank	No response.
1.79	Statewide average student score.	

Sample 2-Point A Response with Annotations for Short-Answer Item 19

19.

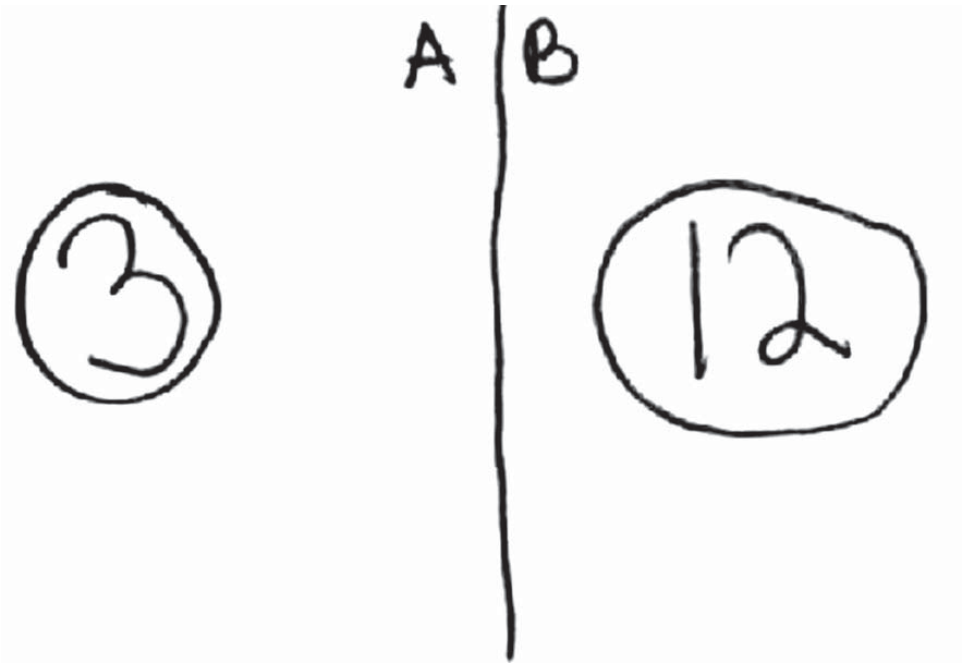


Summary annotation statement:

The student provides correct answers to both parts a and b.

Sample 2-Point B Response with Annotations for Short-Answer Item 19

19.

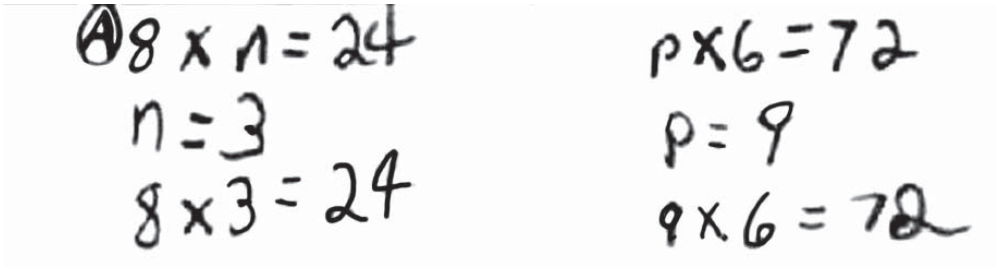


Summary annotation statement:

This student provides correct answers to both parts a and b. This question does not require students to show their work to earn a score point 2 if they find the correct answers.

Sample 1-Point Response with Annotations for Short-Answer Item 19

19.

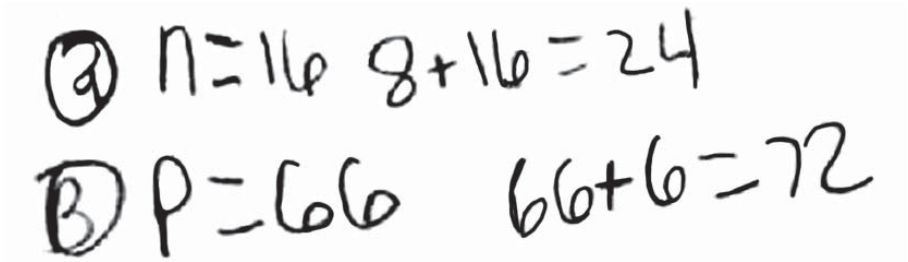


Summary annotation statement:

The student provides the correct answer to part a, but incorrect answer to part b.

Sample 0-Point Response with Annotations for Short-Answer Item 19

19.



Summary annotation statement:

The response is incorrect for both parts a and b. Correct work is present, but it is irrelevant to the item.